

Annex I

CRITICAL LOADS AND LEVELS

I. CRITICAL LOADS OF ACIDITY

A. For Parties within the geographical scope of EMEP

1. Critical loads (as defined in article 1) of acidity for ecosystems are determined in accordance with the Convention's Manual on methodologies and criteria for mapping critical levels/loads and geographical areas where they are exceeded. They are the maximum amount of acidifying deposition an ecosystem can tolerate in the long term without being damaged. Critical loads of acidity in terms of nitrogen take account of within-ecosystem nitrogen removal processes (e.g. uptake by plants). Critical loads of acidity in terms of sulphur do not. A combined sulphur and nitrogen critical load of acidity considers nitrogen only when the nitrogen deposition is greater than the ecosystem nitrogen removal processes. All critical loads reported by Parties are summarized for use in the integrated assessment modelling employed to provide guidance for setting the emission ceilings in annex II.

B. For Parties in North America

2. For eastern Canada, critical sulphur plus nitrogen loads for forested ecosystems have been determined with scientific methodologies and criteria (1997 Canadian Acid Rain Assessment) similar to those in the Convention's Manual on methodologies and criteria for mapping critical levels/loads and geographical areas where they are exceeded. Eastern Canada critical load values (as defined in article 1) of acidity are for sulphate in precipitation expressed in kg/ha/year. Alberta in western Canada, where deposition levels are currently below the environmental limits, has adopted the generic critical load classification systems used for soils in Europe for potential acidity. Potential acidity is defined by subtracting the total (both wet and dry) deposition of base cations from that of sulphur and nitrogen. In addition to critical loads for potential acidity, Alberta has established target and monitoring loads for managing acidifying emissions.
3. For the United States of America, the effects of acidification are evaluated through an assessment of the sensitivity of ecosystems, the total loading within ecosystems of acidifying compounds, and the uncertainty associated with nitrogen removal processes within ecosystems.
4. These loads and effects are used in integrated assessment modelling and provide guidance for setting the emission ceilings and/or reductions for Canada and the United States of America in annex II.

II. CRITICAL LOADS OF NUTRIENT NITROGEN

For Parties within the geographical scope of EMEP

5. Critical loads (as defined in article 1) of nutrient nitrogen (eutrophication) for ecosystems are determined in accordance with the Convention's Manual on methodologies and criteria for mapping critical levels/loads and geographical areas where they are exceeded. They are the maximum amount of eutrophying nitrogen deposition an ecosystem can tolerate in the long term without being damaged. All critical loads reported by Parties are summarized for use in the integrated assessment modelling employed to provide guidance for setting the emission ceilings in annex II.

III. CRITICAL LEVELS OF OZONE

A. For Parties within the geographical scope of EMEP

6. Critical levels (as defined in article 1) of ozone are determined to protect plants in accordance with the Convention's Manual on methodologies and criteria for mapping critical levels/loads and geographical areas where they are exceeded. They are expressed as a cumulative exposure over a threshold ozone concentration of 40 ppb (parts per billion by volume). This exposure index is referred to as AOT40 (accumulated exposure over a threshold of 40 ppb). The AOT40 is calculated as the sum of the differences between the hourly concentration (in ppb) and 40 ppb for each hour when the concentration exceeds 40 ppb.

7. The long-term critical level of ozone for crops of an AOT40 of 3000 ppb.hours for May-July (used as a typical growing season) and for daylight hours was used to define areas at risk where the critical level is exceeded. A specific reduction of exceedances was targeted in the integrated assessment modelling undertaken for the present Protocol to provide guidance for setting the emission ceilings in annex II. The long-term critical level of ozone for crops is considered also to protect other plants such as trees and natural vegetation. Further scientific work is under way to develop a more differentiated interpretation of exceedances of critical levels of ozone for vegetation.

8. A critical level of ozone for human health is represented by the WHO Air Quality Guideline level for ozone of 120 $\mu\text{g}/\text{m}^3$ as an 8-hour average. In collaboration with the World Health Organization's Regional Office for Europe (WHO/EURO), a critical level expressed as an AOT60 (accumulated exposure over a threshold of 60 ppb), i.e. 120 $\mu\text{g}/\text{m}^3$, calculated over one year, was adopted as a surrogate for the WHO Air Quality Guideline for the purpose of integrated assessment modelling. This was used to define areas at risk where the critical level is exceeded. A specific reduction of these exceedances was targeted in the integrated assessment modelling undertaken for the present Protocol to provide guidance for setting the emission ceilings in annex II.

B. For Parties in North America

9. For Canada, critical levels of ozone are determined to protect human health and the environment and are used to establish a Canada-wide Standard for ozone. The emission ceilings in annex II are defined according to the ambition level required to achieve the Canada-wide Standard for ozone.

10. For the United States of America, critical levels of ozone are determined to protect public health with an adequate margin of safety, to protect public welfare from any known or expected adverse effects, and are used to establish a national ambient air quality standard. Integrated assessment modelling and the air quality standard are used in providing guidance for setting the emission ceilings and/or reductions for the United States of America in annex II.

Annex II

EMISSION CEILINGS

The emission ceilings listed in the tables below relate to the provisions of article 3, paragraphs 1 and 10, of the present Protocol. The 1980 and 1990 emission levels and the percentage emission reductions listed are given for information purposes only.

Table 1. Emission ceilings for sulphur (thousands of tonnes of SO₂ per year)

Party	Emission levels		Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
	1980	1990		
Armenia	141	73	73	0%
Austria	400	91	39	-57%
Belarus	740	637	480	-25%
Belgium	828	372	106	-72%
Bulgaria	2050	2008	856	-57%
Canada national a/	4643	3236		
PEMA (SOMA)	3135	1873		
Croatia	150	180	70	-61%
Czech Republic	2257	1876	283	-85%
Denmark	450	182	55	-70%
Finland	584	260	116	-55%
France	3208	1269	400	-68%
Germany	7514	5313	550	-90%
Greece	400	509	546	7%
Hungary	1633	1010	550	-46%
Ireland	222	178	42	-76%
Italy	3757	1651	500	-70%
Latvia	-	119	107	-10%
Liechtenstein	0.39	0.15	0.11	-27%
Lithuania	311	222	145	-35%
Luxembourg	24	15	4	-73%
Netherlands	490	202	50	-75%
Norway	137	53	22	-58%
Poland	4100	3210	1397	-56%
Portugal	266	362	170	-53%
Republic of Moldova	308	265	135	-49%
Romania	1055	1311	918	-30%
Russian Federation b/	7161	4460		
PEMA	1062	1133	635	-44%

Party	Emission levels		Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
	1980	1990		
Slovakia	780	543	110	-80%
Slovenia	235	194	27	-86%
Spain <u>b/</u>	2959	2182	774	-65%
Sweden	491	119	67	-44%
Switzerland	116	43	26	-40%
Ukraine	3849	2782	1457	-48%
United Kingdom	4863	3731	625	-83%
United States of America <u>c/</u>				
European Community	26456	16436	4059	-75%

a/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, Canada shall submit an emission ceiling for sulphur, either at a national level or for its PEMA, and will endeavour to provide a ceiling for 2010. The PEMA for sulphur will be the sulphur oxides management area (SOMA) that was designated pursuant to annex III to the Protocol on Further Reduction of Sulphur Emissions adopted at Oslo on 14 June 1994 as the South-east Canada SOMA. This is an area of 1 million km₂ which includes all the territory of the provinces of Prince Edward Island, Nova Scotia and New Brunswick, all the territory of the province of Quebec south of a straight line between Havre-St. Pierre on the north coast of the Gulf of Saint Lawrence and the point where the Quebec-Ontario boundary intersects the James Bay coastline, and all the territory of the province of Ontario south of a straight line between the point where the Ontario-Quebec boundary intersects the James Bay coastline and Nipigon River near the north shore of Lake Superior.

b/ Figures apply to the European part within the EMEP area.

c/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, the United States of America shall provide for inclusion in this annex: (a) specific emission reduction measures applicable to mobile and stationary sources of sulphur to be applied either nationally or within a PEMA if it has submitted a PEMA for sulphur for inclusion in annex III; (b) a value for total estimated sulphur emission levels for 1990, either national or for the PEMA; (c) an indicative value for total sulphur emission levels for 2010, either national or for the PEMA; and (d) associated estimates of the percentage reduction in sulphur emissions. Item (b) will be included in the table and items (a), (c) and (d) will be included in a footnote to the table.

Table 2. Emission ceilings for nitrogen oxides (thousands of tonnes of NO₂ per year)

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Armenia	46	46	0%
Austria	194	107	-45%
Belarus	285	255	-11%
Belgium	339	181	-47%

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Bulgaria	361	266	-26%
Canada a1/	2104		
Croatia	87	87	0%
Czech Republic	742	286	-61%
Denmark	282	127	-55%
Finland	300	170	-43%
France	1882	860	-54%
Germany	2693	1081	-60%
Greece	343	344	0%
Hungary	238	198	-17%
Ireland	115	65	-43%
Italy	1938	1000	-48%
Latvia	93	84	-10%
Liechtenstein	0.63	0.37	-41%
Lithuania	158	110	-30%
Luxembourg	23	11	-52%
Netherlands	580	266	-54%
Norway	218	156	-28%
Poland	1280	879	-31%
Portugal	348	260	-25%
Republic of Moldova	100	90	-10%
Romania	546	437	-20%
Russian Federation b1/	3600		
PEMA	360	265	-26%
Slovakia	225	130	-42%
Slovenia	62	45	-27%
Spain b1/	1113	847	-24%
Sweden	338	148	-56%
Switzerland	166	79	-52%
Ukraine	1888	1222	-35%
United Kingdom	2673	1181	-56%
United States of America c1/			
European Community	13161	6671	-49%

a1/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, Canada shall submit 1990 emission levels and 2010 emission ceilings for nitrogen oxides, either at a national level or for its PEMA for nitrogen oxides, if it has submitted one.

b1/ Figures apply to the European part within the EMEP area.

c1/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, the United States of America shall provide for inclusion in this annex: (a) specific emission reduction measures applicable to mobile and stationary sources of nitrogen oxides to be applied either nationally or within a PEMA if it has submitted a PEMA for nitrogen oxides for inclusion in annex III; (b) a value for total estimated nitrogen oxide emission levels for 1990, either national or for the PEMA; (c) an indicative value for total nitrogen oxide emission levels for 2010, either national or for the PEMA; and (d) associated estimates of the percentage reduction in nitrogen oxide emissions. Item (b) will be included in the table and items (a), (c) and (d) will be included in a footnote to the table.

Table 3. Emission ceilings for ammonia (thousands of tonnes of NH₃ per year)

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Armenia	25	25	0%
Austria	81	66	-19%
Belarus	219	158	-28%
Belgium	107	74	-31%
Bulgaria	144	108	-25%
Croatia	37	30	-19%
Czech Republic	156	101	-35%
Denmark	122	69	-43%
Finland	35	31	-11%
France	814	780	-4%
Germany	764	550	-28%
Greece	80	73	-9%
Hungary	124	90	-27%
Ireland	126	116	-8%
Italy	466	419	-10%
Latvia	44	44	0%
Liechtenstein	0.15	0.15	0%
Lithuania	84	84	0%
Luxembourg	7	7	0%
Netherlands	226	128	-43%
Norway	23	23	0%
Poland	508	468	-8%
Portugal	98	108	10%

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Republic of Moldova	49	42	-14%
Romania	300	210	-30%
Russian Federation a2/	1191		
PEMA	61	49	-20%
Slovakia	62	39	-37%
Slovenia	24	20	-17%
Spain a2/	351	353	1%
Sweden	61	57	-7%
Switzerland	72	63	-13%
Ukraine	729	592	-19%
United Kingdom	333	297	-11%
European Community	3671	3129	-15%

a2/ Figures apply to the European part within the EMEP area.

Table 4. Emission ceilings for volatile organic compounds (thousands of tonnes of VOC per year)

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Armenia	81	81	0%
Austria	351	159	-55%
Belarus	533	309	-42%
Belgium	324	144	-56%
Bulgaria	217	185	-15%
Canada a3/	2880		
Croatia	105	90	-14%
Czech Republic	435	220	-49%
Denmark	178	85	-52%
Finland	209	130	-38%
France	2957	1100	-63%
Germany	3195	995	-69%
Greece	373	261	-30%
Hungary	205	137	-33%
Ireland	197	55	-72%
Italy	2213	1159	-48%

Party	Emission levels 1990	Emission ceilings for 2010	Percentage emission reductions for 2010 (base year 1990)
Latvia	152	136	-11%
Liechtenstein	1.56	0.86	-45%
Lithuania	103	92	-11%
Luxembourg	20	9	-55%
Netherlands	502	191	-62%
Norway	310	195	-37%
Poland	831	800	-4%
Portugal	640	202	-68%
Republic of Moldova	157	100	-36%
Romania	616	523	-15%
Russian Federation <u>b3/</u>	3566		
PEMA	203	165	-19%
Slovakia	149	140	-6%
Slovenia	42	40	-5%
Spain <u>b3/</u>	1094	669	-39%
Sweden	526	241	-54%
Switzerland	292	144	-51%
Ukraine	1369	797	-42%
United Kingdom	2555	1200	-53%
United States of America <u>c3/</u>			
European Community	15353	6600	-57%

a3/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, Canada shall submit 1990 emission levels and 2010 emission ceilings for volatile organic compounds, either at a national level or for its PEMA for volatile organic compounds, if it has submitted one.

b3/ Figures apply to the European part within the EMEP area.

c3/ Upon ratification, acceptance or approval of, or accession to, the present Protocol, the United States of America shall provide for inclusion in this annex: (a) specific emission reduction measures applicable to mobile and stationary sources of volatile organic compounds to be applied either nationally or within a PEMA if it has submitted a PEMA for volatile organic compounds for inclusion in annex III; (b) a value for total estimated volatile organic compound emission levels for 1990, either national or for the PEMA; (c) an indicative value for total volatile organic compound emission levels for 2010, either national or for the PEMA; and (d) associated estimates of the percentage reduction in volatile organic compound emissions. Item (b) will be included in the table and items (a), (c) and (d) will be included in a footnote to the table.

Annex III

DESIGNATED POLLUTANT EMISSIONS MANAGEMENT AREA (PEMA)

The following PEMA is listed for the purpose of the present Protocol:

Russian Federation PEMA

This is the area of Murmansk oblast, the Republic of Karelia, Leningrad oblast (including St. Petersburg), Pskov oblast, Novgorod oblast and Kaliningrad oblast. The boundary of the PEMA coincides with the State and administrative boundaries of these constituent entities of the Russian Federation.

Annex IV

LIMIT VALUES FOR EMISSIONS OF SULPHUR FROM STATIONARY SOURCES

1. Section A applies to Parties other than Canada and the United States of America, section B applies to Canada and section C applies to the United States of America.

A. Parties other than Canada and the United States of America

2. For the purpose of section A, except table 2 and paragraphs 11 and 12, limit value means the quantity of a gaseous substance contained in the waste gases from an installation that is not to be exceeded. Unless otherwise specified, it shall be calculated in terms of mass of pollutant per volume of the waste gases (expressed as mg/m³), assuming standard conditions for temperature and pressure for dry gas (volume at 273.15 K, 101.3 kPa). With regard to the oxygen content of the exhaust gas, the values given in the tables below for each source category shall apply. Dilution for the purpose of lowering concentrations of pollutants in waste gases is not permitted. Start-up, shutdown and maintenance of equipment are excluded.

3. Emissions shall be monitored in all cases. Compliance with limit values shall be verified. The methods of verification can include continuous or discontinuous measurements, type approval, or any other technically sound method.

4. Sampling and analysis of pollutants, as well as reference measurement methods to calibrate any measurement system, shall be carried out in accordance with the standards laid down by the European Committee for Standardization (CEN) or by the International Organization for Standardization (ISO). While awaiting the development of CEN or ISO standards, national standards shall apply.

5. Measurements of emissions should be carried out continuously when emissions of SO₂ exceed 75 kg/h.

6. In the case of continuous measurement for new plant, compliance with the emission standards is achieved if the calculated daily mean values do not exceed the limit value and if no hourly value exceeds the limit value by 100%.

7. In the case of continuous measurements for existing plant, compliance with the emission standards is achieved if (a) none of the monthly mean values exceeds the limit values; and (b) 97% of all the 48-hour mean values do not exceed 110% of the limit values.

8. In the case of discontinuous measurements, as a minimum requirement, compliance with the emission standards is achieved if the mean value based on an appropriate number of measurements under representative conditions does not exceed the value of the emission standard.

9. Boilers and process heaters with a rated thermal input exceeding 50 MWth:

Table 1. Limit values for SO_x emissions released from boilers ^{a/}

	Thermal input (MW _{th})	Limit value (mg SO ₂ /Nm ³) ^{b/}	Alternative for domestic solid fuels removal efficiency
Solid and liquid fuels, new installations	50 - 100	850	90% ^{d/}
	100 - 300	850 - 200 ^{e/} (linear decrease)	92% ^{d/}
	> 300	200 ^{e/}	95% ^{d/}
Solid fuels, existing installations	50 - 100	2000	
	100 - 500	2000 - 400 (linear decrease)	
	> 500	400	
	50 - 150		40%
	150 - 500		40 - 90% (linear increase)
	> 500		90%
Liquid fuels, existing installations	50 - 300	1700	
	300 - 500	1700 - 400 (linear decrease)	
	> 500	400	
Gaseous fuels in general, new and existing installations		35	
Liquefied gas, new and existing installations		5	
Low-calorific-value gases (e.g. gasification of refinery residues or combustion of coke oven gas)		new 400 existing 800	
Blast-furnace gas		new 200 existing 800	
New combustion plant in refineries (average of all new combustion installations)	> 50 (total refinery capacity)	600	
Existing combustion plant in refineries (average of all existing combustion installations)		1000	

^{a/} In particular, the limit values shall not apply to:

- Plant in which the products of combustion are used for direct heating, drying, or any other treatment of objects or materials, e.g. reheating furnaces, furnaces for heat treatment;
- Post-combustion plant, i.e. any technical apparatus designed to purify the waste gases by combustion that is not operated as an independent combustion plant;

- Facilities for the regeneration of catalytic cracking catalysts;
- Facilities for the conversion of hydrogen sulphide into sulphur;
- Reactors used in the chemical industry;
- Coke battery furnaces;
- Cowpers;
- Waste incinerators; and
- Plant powered by diesel, petrol or gas engines or by combustion turbines, irrespective of the fuel used.

b/ The O₂ reference content is 6% for solid fuels and 3% for others.

c/ 400 with heavy fuel oil S <0.25%.

d/ If an installation reaches 300 mg/Nm³ SO₂, it may be exempted from applying the removal efficiency.

10. Gas oil:

Table 2. Limit values for the sulphur content of gas oil a/

	Sulphur content (per cent by weight)
Gas oil	< 0.2 after 1 July 2000 < 0.1 after 1 January 2008

a/ "Gas oil" means any petroleum product within HS 2710, or any petroleum product which, by reason of its distillation limits, falls within the category of middle distillates intended for use as fuel and of which at least 85 per cent by volume, including distillation losses, distils at 350°C. Fuels used in on-road and non-road vehicles and agricultural tractors are excluded from this definition. Gas oil intended for marine use is included in the definition if it meets the description above or it has a viscosity or density falling within the ranges of viscosity or density defined for marine distillates in table I of ISO 8217 (1996).

11. Claus plant: for plant that produces more than 50 Mg of sulphur a day:

- (a) Sulphur recovery 99.5% for new plant;
- (b) Sulphur recovery 97% for existing plant.

12. Titanium dioxide production: in new and existing installations, discharges arising from digestion and calcination steps in the manufacture of titanium dioxide shall be reduced to a value of not more than 10 kg of SO₂ equivalent per Mg of titanium dioxide produced.

B. Canada

13. Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source category will be determined on the basis of available information on control technology and levels including limit values applied in other countries and the following document: Canada Gazette, Part I. Department of the Environment. Thermal Power Generation Emissions - National Guidelines for New Stationary Sources. May 15, 1993. pp. 1633-1638.

C. United States of America

14. Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source categories are specified in the following documents:

- (a) Electric Utility Steam Generating Units - 40 Code of Federal Regulations (C.F.R.) Part 60, Subpart D, and Subpart Da;
- (b) Industrial-Commercial-Institutional Steam Generating Units - 40 C.F.R. Part 60, Subpart Db, and Subpart Dc;
- (c) Sulphuric Acid Plants - 40 C.F.R. Part 60, Subpart H;
- (d) Petroleum Refineries - 40 C.F.R. Part 60, Subpart J;
- (e) Primary Copper Smelters - 40 C.F.R. Part 60, Subpart P;
- (f) Primary Zinc Smelters - 40 C.F.R. Part 60, Subpart Q;
- (g) Primary Lead Smelters - 40 C.F.R. Part 60, Subpart R;
- (h) Stationary Gas Turbines - 40 C.F.R. Part 60, Subpart GG;
- (i) Onshore Natural Gas Processing - 40 C.F.R. Part 60, Subpart LLL;
- (j) Municipal Waste Combustors - 40 C.F.R. Part 60, Subpart Ea, and Subpart Eb; and
- (k) Hospital/Medical/Infectious Waste Incinerators - 40 C.F.R. Part 60, Subpart Ec.

Note

1/ Monitoring is to be understood as an overall activity, comprising measuring of emissions, mass balancing, etc. It can be carried out continuously or discontinuously.

Annex V

LIMIT VALUES FOR EMISSIONS OF NITROGEN OXIDES FROM STATIONARY SOURCES

1. Section A applies to Parties other than Canada and the United States of America, section B applies to Canada and section C applies to the United States of America.

A. Parties other than Canada and the United States of America

2. For the purpose of section A, limit value means the quantity of a gaseous substance contained in the waste gases from an installation that is not to be exceeded. Unless otherwise specified, it shall be calculated in terms of mass of pollutant per volume of the waste gases (expressed as mg/m³), assuming standard conditions for temperature and pressure for dry gas (volume at 273.15 K, 101.3 kPa). With regard to the oxygen content of exhaust gas, the values given in the tables below for each source category shall apply. Dilution for the purpose of lowering concentrations of pollutants in waste gases is not permitted. Limit values generally address NO together with NO₂, commonly named NO_x, expressed as NO₂. Start-up, shutdown and maintenance of equipment are excluded.

3. Emissions shall be monitored 1/ in all cases. Compliance with limit values shall be verified. The methods of verification can include continuous or discontinuous measurements, type approval, or any other technically sound method.

4. Sampling and analysis of pollutants, as well as reference measurement methods to calibrate any measurement system, shall be carried out in accordance with the standards laid down by the European Committee for Standardization (CEN) or by the International Organization for Standardization (ISO). While awaiting the development of CEN or ISO standards, national standards shall apply.

5. Measurements of emissions should be carried out continuously when emissions of NO_x exceed 75 kg/h.

6. In the case of continuous measurements, except for existing combustion plant covered in table 1, compliance with the emission standards is achieved if the calculated daily mean values do not exceed the limit value and if no hourly value exceeds the limit value by 100%.

7. In the case of continuous measurements for existing combustion plant covered in table 1, compliance with the emission standards is achieved if (a) none of the monthly mean values exceeds the emission limit values; and (b) 95% of all the 48-hour mean values do not exceed 110% of the emission limit values.

8. In the case of discontinuous measurements, as a minimum requirement, compliance with the emission standards is achieved if the mean value based on an appropriate number of measurements under representative conditions does not exceed the value of the emission standard.

9. Boilers and process heaters with a rated thermal input exceeding 50 MWth:

Table 1. Limit values for NOx emissions released from boilers a/

	Limit value (mg/Nm ³) <u>b/</u>
Solid fuels, new installations:	
- Boilers 50 - 100 MW _{th}	400
- Boilers 100 - 300 MW _{th}	300
- Boilers >300 MW _{th}	200
Solid fuels, existing installations:	
- Solid in general	650
- Solid with less than 10% volatile compounds	1300
Liquid fuels, new installations:	
- Boilers 50 - 100 MW _{th}	400
- Boilers 100 - 300 MW _{th}	300
- Boilers >300 MW _{th}	200
Liquid fuels, existing installations	450
Gaseous fuels, new installations:	
Fuel: natural gas	
- Boilers 50 - 300 MW _{th}	150
- Boilers > 300 MW _{th}	100
Fuel: all other gases	200
Gaseous fuels, existing installations	350

- a/ In particular, the limit values shall not apply to:
- Plant in which the products of combustion are used for direct heating, drying, or any other treatment of objects or materials, e.g. reheating furnaces, furnaces for heat treatment;
 - Post-combustion plant, i.e. any technical apparatus designed to purify the waste gases by combustion that is not operated as an independent combustion plant;
 - Facilities for the regeneration of catalytic cracking catalysts;
 - Facilities for the conversion of hydrogen sulphide into sulphur;
 - Reactors used in the chemical industry;
 - Coke battery furnaces;
 - Cowpers;
 - Waste incinerators; and
 - Plant powered by diesel, petrol or gas engines or by combustion turbines, irrespective of the fuel used.

b/ These values do not apply to boilers running less than 500 hours a year. The O₂ reference content is 6% for solid fuels and 3% for others.

10. Onshore combustion turbines with a rated thermal input exceeding 50MW_{th}: the NOx limit values expressed in mg/Nm³ (with an O₂ content of 15%) are to be applied to a single turbine. The limit values in table 2 apply only above 70% load.

Table 2. Limit values for NOx emissions released from onshore combustion turbines

> 50 MW _{th} (Thermal input at ISO conditions)	Limit value (mg/Nm ³)
New installations, natural gas ^{a/}	50 ^{b/}
New installations, liquid fuels ^{c/}	120
Existing installations, all fuels ^{d/}	
- Natural gas	150
- Liquid	200

a/ Natural gas is naturally occurring methane with not more than 20% (by volume) of inerts and other constituents.

b/ 75 mg/Nm³ if:

- Combustion turbine used in a combined heat and power system; or
- Combustion turbine driving compressor for public gas grid supply.

For combustion turbines not falling into either of the above categories, but having an efficiency greater than 35%, determined at ISO base load conditions, the limit value shall be $50 \cdot n / 35$ where n is the combustion turbine efficiency expressed as a percentage (and determined at ISO base load conditions).

c/ This limit value applies only to combustion turbines firing light and medium distillates.

d/ The limit values do not apply to combustion turbines running less than 150 hours a year.

11. Cement production:

Table 3. Limit values for NOx emissions released from cement production a/

	Limit value (mg/Nm ³)
New installations (10% O ₂)	
- Dry kilns	500
- Other kilns	800
Existing installations (10% O ₂)	1200

a/ Installations for the production of cement clinker in rotary kilns with a capacity >500 Mg/day or in other furnaces with a capacity >50 Mg/day.

12. Stationary engines:

Table 4. Limit values for NOx emissions released from new stationary engines

Capacity, technique, fuel specification	Limit value ^{a/} (mg/Nm ³)
Spark ignition (= Otto) engines, 4-stroke, > 1 MW _{th}	
- Lean-burn engines	250
- All other engines	500
Compression ignition (= Diesel) engines, > 5 MW _{th}	
- Fuel: natural gas (jet ignition engines)	500
- Fuel: heavy fuel oil	600
- Fuel: diesel oil or gas oil	500

a/ These values do not apply to engines running less than 500 hours a year. The O₂ reference content is 5%.

13. Production and processing of metals:

Table 5. Limit values for NOx emissions released from primary iron and steel a/ production

Capacity, technique, fuel specification	Limit value (mg/Nm ³)
New and existing sinter plant	400

a/ Production and processing of metals: metal ore roasting or sintering installations, installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting with a capacity exceeding 2.5 Mg/hour, installations for the processing of ferrous metals (hot rolling mills > 20 Mg/hour of crude steel).

14. Nitric acid production:

Table 6. Limit values for NOx emissions released from nitric acid production excluding acid concentration units

Capacity, technique, fuel specification	Limit value (mg/Nm ³)
- New installations	350
- Existing installations	450

B. Canada

15. Limit values for controlling emissions of nitrogen oxides (NOx) from new stationary sources in the following stationary source categories will be determined on the basis of available information on control technology and levels including limit values applied in other countries and the following documents:

(a) Canadian Council of Ministers of the Environment (CCME). National Emission Guidelines for Stationary Combustion Turbines. December 1992. PN1072;

(b) Canada Gazette, Part I. Department of the Environment. Thermal Power Generation Emissions - National Guidelines for New Stationary Sources. May 15, 1993. pp. 1633-1638; and

(c) CME. National Emission Guidelines for Cement Kilns. March 1998. PN1284.

C. United States of America

16. Limit values for controlling emissions of NOx from new stationary sources in the following stationary source categories are specified in the following documents:

- (a) Coal-fired Utility Units - 40 Code of Federal Regulations (C.F.R.) Part 76;
- (b) Electric Utility Steam Generating Units - 40 C.F.R. Part 60, Subpart D, and Subpart Da;
- (c) Industrial-Commercial-Institutional Steam Generating Units - 40 C.F.R. Part 60, Subpart Db;
- (d) Nitric Acid Plants - 40 C.F.R. Part 60, Subpart G;
- (e) Stationary Gas Turbines - 40 C.F.R. Part 60, Subpart GG;
- (f) Municipal Waste Combustors - 40 C.F.R. Part 60, Subpart Ea, and Subpart Eb; and
- (g) Hospital/Medical/Infectious Waste Incinerators - 40 C.F.R. Part 60, Subpart Ec.

Note

1/ Monitoring is to be understood as an overall activity, comprising measuring of emissions, mass balancing, etc. It can be carried out continuously or discontinuously.